APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,466	03/20/2001	Bruno C. Silva	MICR0195	3599

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EXAMINER
GOOD JOHNSON, MOTILEWA

ART UNIT	PAPER NUMBER
2672	4

DATE MAILED: 09/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/813,466	SILVA, BRUNO C.
	Examiner	Art Unit
	Motilewa A. Good-Johnson	2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>25 June 2003</u> .

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-36</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-36</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>20 March 2001</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

     If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____ .

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

     a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)   4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5)☐ Notice of Informal Patent Application (PTO-152)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .   6)☐ Other: .

DETAILED ACTION

1.   This office action is responsive to the following communications: Application,

filed 03/20/2001; Amendment A, filed 06/30/2003

2.   Claims 1-36 are pending in this application. Claims 1, 16 and 24 are

independent claims. No claims have yet been amended.

3.   The present title of the application is "Morph Map Based Real-Time Rendering"

(as originally filed).

Drawings

4.   Color photographs and color drawings are acceptable only for examination

purposes unless a petition filed under 37 CFR 1.84(a)(2) is granted permitting their use

as acceptable drawings. In the event that applicant wishes to use the drawings

currently on file as acceptable drawings, a petition must be filed for acceptance of the

color photographs or color drawings as acceptable drawings. Any such petition must be

accompanied by the appropriate fee set forth in 37 CFR 1.17(h), three sets of color

drawings or color photographs, as appropriate, and an amendment to the first

paragraph of the brief description of the drawings section of the specification which

states:

> The patent or application file contains at least one drawing executed in color. Copies of this patent or
> patent application publication with color drawing(s) will be provided by the U.S. Patent and Trademark
> Office upon request and payment of the necessary fee.

Color photographs will be accepted if the conditions for accepting color drawings

have been satisfied.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed
publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6.   Claims 1-36 rejected under 35 U.S.C. 102(a) as being anticipated by Blanz et al.,

A Morphable Model for the Synthesis of 3D Faces, ACM, 1993, pages 279-288.

As per independent claim 1, a method for simulating a real-time rendering . . .

comprising the steps of: a) precomputing data defining a behavior of light rays

illuminating the object in regard to the single static viewpoint based on a plurality of

input images, to produce a plurality of morph maps . . . ; (Blanz discloses illuminations

conditions can be variables subject to optimization, page 188, section 1.1) b) in

response to one of a user action and an event that indicates the desired graphical

effect, performing a transformation two-dimensionally using the plurality of morph maps

. . . ; (Blanz discloses a set of facial expressions expressed two dimensional for

morphing, i.e. transformation, page 189, section 3.1, see also figure 4, page 190) and c)

displaying the output image. (Blanz discloses displaying the illuminated corrected

morphed image, figure 4, page 190)

With respect to dependent claim 2, precomputing comprises the step of

producing data that include a blend factor. (Blanz discloses blending the borders of the

image data according to an algorithm proposed for images, page 189, section 3)

With respect to dependent claim 3, precomputing comprises the step of producing data that include an additive factor that is used to control saturation of the output image. (Blanz discloses adding to or subtracting vectors, which will manipulate a specific attribute, page 189, section 3.1, see also figure 2)

With respect to dependent claim 4, precomputing comprises the step of tracing rays of light to determine the plurality of morph maps . . . (Blanz discloses rendering parameters including the intensity of directed light and other light features, page 190, section 4)

With respect to dependent claim 5, a) producing a plurality of warped images . . . ; and b) combining the plurality of warped images over a range, with a cross-dissolve, to produce successive output images . . . (Blanz discloses reconstruction by warping the image to generate new orientation, figure 8, page 194)

With respect to dependent claim 6, performing the transformation comprises the step of mapping a selected portion of a surface of the object onto a different part of the object to simulate an effect corresponding to movement . . . (Blanz discloses the performing morphing for motion-capture data to pictures or 3D face models, page 187, section 1)

With respect to dependent claim 7, only pixels of the object that have been altered during the transformation to implement the effect are recomputed in the output image. (Blanz discloses that in mapping the facial attributes only attributes that have been manipulated will change while other attributes are kept constant, therefore making

it inherent that only the pixels in the portion of the face that have been altered will be changed, i.e. recomputed, page 189, section 3.1)

With respect to dependent claim 8, a) providing a grid of cells that overlies and bounds pixels . . . ; b) for each cell of the grid, associating an arbitrary rectangle . . . ; and c) determining a union of all rectangles . . . (Blanz discloses a segmented morphable model, page 189, section 3)

With respect to dependent claim 9, using an index to map between a region in an input image and a corresponding region in the output image, to determine which portion of one of the input image and the output image is changed . . . (Blanz discloses increasing the expressiveness of the model by dividing the faces into sub regions which are morphed independently to define the regions on a reference face, page 189, section 3)

With respect to dependent claim 10, a) mapping a texture onto the object in the output image; b) applying a reflection to the object . . . ; c) applying a refraction of the object . . . (Blanz discloses morphing the image using model parameters such as intensity of ambient light, and the intensity of directed light, and further using Phong illumination which takes in account the direction of the reflected ray, pages 190-191, section 4)

With respect to dependent claim 11, precomputing includes the step of storing anti-aliasing data for use in producing the output image. (Blanz discloses an optic flow to generate a smooth interpolation of the vectors coupled with their neighbors, therefore providing an algorithm to the user for antialiasing the image, page 192, section 5.1)

With respect to dependent claim 12, precomputing is based on one of a three-dimensional geometry of the input images and a set of properties of a material in the input images. (Blanz discloses morphing based upon shape and texture, see page 189, figure 2)

With respect to dependent claim 13, data produced in the step of precomputing includes a lookup table in which parameters used in producing the output image are stored. (Blanz discloses the use of a database to store the data, section 2, page 188, therefore making it inherent that the data could be stored in other storage means such as a look-up table)

With respect to dependent claims 14 and 15, they are rejected based upon similar rational as above independent claim 1.

As per independent claim 16, a method for simulating the rendering of graphical effects . . . comprising the steps of: a) precomputing a plurality of morph maps of a displayed scene . . . ; (Blanz discloses generating morphable face models of a plurality of photographs, abstract) b) storing the morph maps for subsequent use in simulating rendering of a selected effect . . . ; (Blanz discloses storing the pre-processing scans for the morph maps, page 188, section 2) c) transforming at least one input image using a blending of the plurality of morph maps . . . ; (Blanz discloses transforming the shape and texture of the exampled into a vector space representation and modeling the new faces by forming linear combinations, abstract) and d) displaying the output image . . . (Blanz discloses displaying the output image, figure 1)

With respect to dependent claim 17, a) anti-aliasing to smooth edges in the output image; (Blanz discloses an optic flow which generates a smooth interpolation of the vectors coupled with their neighbors, therefore providing an algorithm to the user for antialiasing the image, page 192, section 5.1) b) displaying light refraction . . . ; c) displaying light reflection . . . ; (Blanz discloses on page 193 new illumination for morphing an image) d) morphing between an object in the displayed scene and a substantially altered object . . . ; (Blanz discloses in figure 4, page 190) and e) dynamically warping a selected portion . . . (Blanz discloses in figure 8, page 194)

With respect to dependent claim 18, a) an index that identifies a pixel data set from among a plurality . . . ; b) an image identifier . . . that indicates one of: i) the input image . . . ; and ii) a constant color . . . ; c) coordinates of the pixel in the input image; (Blanz discloses the morphable model defined by a shape vector which represents the geometry that contains the coordinates, and a texture vector that contains the color values of the vertices of the image, page 189, section 3) d) the constant color that is to be applied to the pixel . . . ; (Blanz discloses a normal distribution to the data based on the average shape and texture to generate the differences, page 189, section 3) f) an additive factor used to shift the appearance . . . ; (Blanz discloses multiples of the shape and texture can be added to or subtracted from any individual face, page 190, section 3.1) and g) a blending factor . . . (Blanz discloses blending the borders of the image data according to an algorithm proposed for images, page 189, section 3)

With respect to dependent claim 19, precomputing comprises the step of computing the plurality of morph maps with a light-simulating algorithm . . . (Blanz

discloses rendering parameters including the intensity of directed light and other light features, page 190, section 4)

With respect to dependent claim 20, rendering of a textured patch on a surface of an object as the patch is dragged over the surface . . . (Blanz discloses computing the correspondence in high resolution considering shape and texture data simultaneously and making deformations plausible, page 188, section 1.1)

With respect to dependent claim 21, rendering of an object simulating a refraction that occurs as light reflected from the object passes through a non-homogeneous medium . . . (Blanz discloses rendering parameters including the intensity of directed light and other light features, page 190, section 4)

With respect to dependent claim 22, only pixels in the input image that have changed are transformed to produce the output image. (Blanz discloses that in mapping the facial attributes only attributes that have been manipulated will change while other attributes are kept constant, therefore making it inherent that only the pixels in the portion of the face that have been altered will be changed, i.e. recomputed, page 189, section 3.1)

With respect to dependent claim 23, bi-directionally mapping between each of a plurality of pixels in a selected region of the input image and a corresponding pixel in a corresponding region of the output image . . . (Blanz discloses in figure 2, page 189 allowing a user to add to or subtract from a morphable model to generate a deviation in the shape and texture, therefore allow for bi-direction mapping between each region)

As per independent claim 24 and dependent claims 25-36, they are rejected

based upon similar rational as above independent claim 1 and dependent claims 2-15

respectively.

Response to Arguments

7.   Applicant's arguments with respect to claims 1-36 have been considered but are

moot in view of the new ground(s) of rejection.

Conclusion

8.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Motilewa A. Good-Johnson whose telephone number is (703) 305-3939. The examiner can normally be reached on Monday - Friday 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Motilewa A. Good-Johnson
Examiner
Art Unit 2672

mgj
August 28, 2003
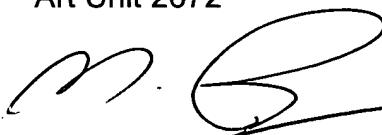
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